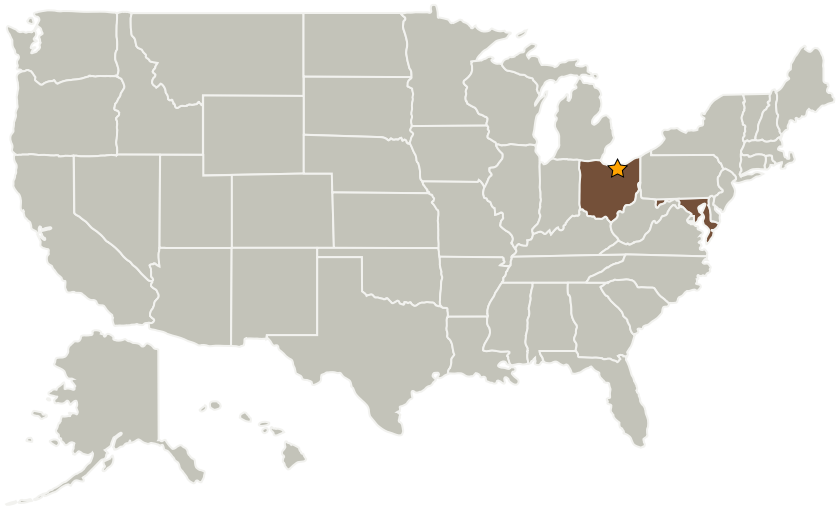
Reconfigurable, Cognitive Software Defined Radio, Phase II

Completed Technology Project (2009 - 2012)

Project Introduction

IAI is actively developing Software Defined Radio platforms that can adaptively switch between different modes of operation by modifying both transmit waveforms and receiver signal-processing tasks on the fly. The proposed software reconfigurable radio implementation technique and the system design will leverage IAI's experience in SDRs, RF design, signal processing and firmware design. Our innovation focuses on implementing maximum transceiver functionalities digital reconfigurable devices (FPGA), and minimizing the number of analog components. Our SDR designs are based on COTS components and are modular in nature. This makes it easier to upgrade smaller units of the design with development in state-of-the-art, instead of re-designing the entire SDR platform. The proposed innovations are: • STRS implementation on COTS SDR platforms to realize NASA objectives of simultaneously capturing the benefits of SDR technology and the economies and benefits of an open architecture standard. • Integration of cognitive capabilities (with focus on STRS compliant implementation) for the SDR which have been developed under the Phase-I contract. This would include Adaptive Modulation and Coding, Automatic modulation recognition and Spectrum Sensing. • Reconfigurable digital transceiver design using high-speed FPGAs. This would enable multi-mode operation and scalable architecture for SDRs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

December 2009: Project Start

March 2012: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.5 Revolutionary Communications Technologies
    - TX05.5.1 Cognitive Networking